



Teledyne Semiconductor and Spectra-Physics Lasers Superfund Sites / Mountain View, California



U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • April 2018

EPA Seeks Public Comment on Proposed Changes to Site Cleanup Plan

Introduction

The following is the U.S. Environmental Protection Agency's (EPA) cleanup plan to address contaminated groundwater, soil, and potential vapor intrusion at the Teledyne/Spectra-Physics Superfund Sites (to be referred to throughout this fact sheet as "the Site") in Mountain View, CA (*Figure 1*). EPA originally selected a groundwater cleanup plan called a remedy for the site in 1991, which included groundwater extraction and treatments, and monitored natural attenuation, a process where chemicals break down naturally (and are monitored) over time. EPA proposes to change the remedy because the groundwater treatment system central to the remedy is no longer effective and because vapor intrusion (see page 3 for more information) was not considered in the original remedy.

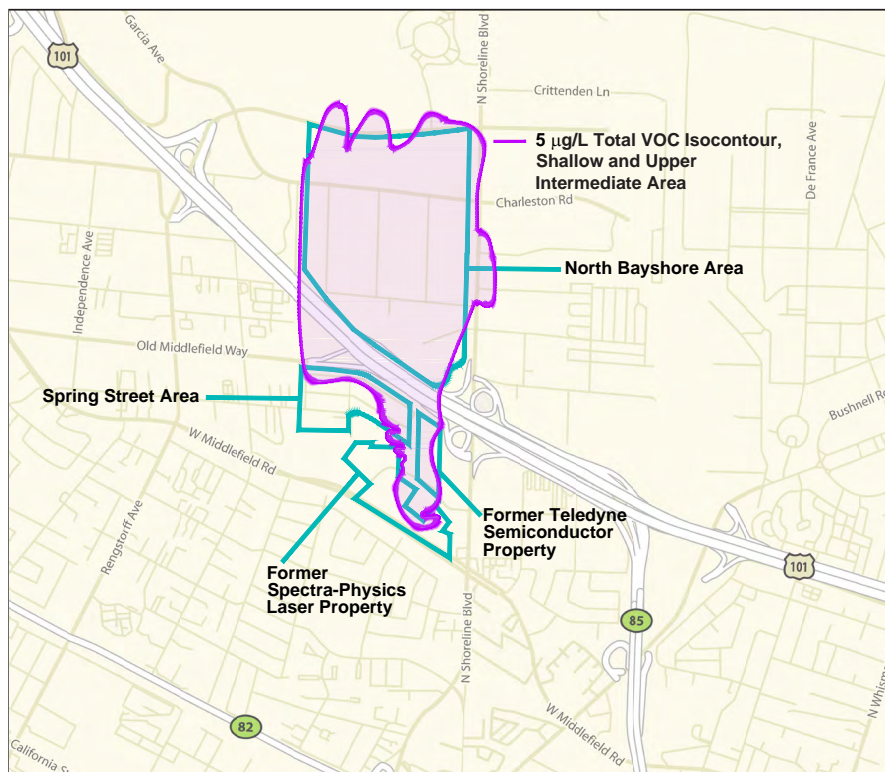


Figure 1: Teledyne/Spectra Physics Superfund Site



Public Meeting

EPA will hold a public meeting to explain and answer questions about this Proposed Plan. Oral and written comments will also be accepted at the meeting. The meeting will take place on:

**Thursday, May 24th, 2018
6:00 p.m.**

Senior Center
266 Escuela Avenue
Mountain View, CA 94040

EPA Seeks Your Comments on this Proposed Cleanup Plan

EPA welcomes your comments on the Proposed Plan and other supporting documents EPA used to propose cleanup in EPA's Administrative Record File. **Official comments may be made at the public meeting or submitted by email, fax, phone or postal mail no later than June 1st.** You can send your comments to:

Angela Sandoval
EPA Project Manager
75 Hawthorne Street (SFD-7-1)
San Francisco, CA 94105
(415) 972-3831
sandoval.angela@epa.gov



Figure 2: TCE in Groundwater Before and After Bioremediation

This fact sheet describes EPA’s new preferred cleanup plan for the site and the reasons for selecting this plan. The plan also provides basic background information, cleanup goals, and a summary of other cleanup plans that were considered. EPA seeks your comments on this plan. Your comments and suggestions may result in changes to the plan. EPA will review all comments, and the final cleanup plan, called a Record of Decision (ROD), will include a summary of EPA responses to public comments.

For a detailed information and analysis that this plan is based on, see the March 9, 2017 Focused Feasibility Study report and other documents in the Administrative Record (AR) file. The AR is the collection of documents EPA used to create the preferred alternative. See page 9 for information on locations of the information repositories to obtain these documents.

Site Background

The site includes the former Teledyne Semiconductor (Teledyne) property located at 1300 Terra Bella Avenue and the former Spectra-Physics Lasers (Spectra-Physics) property located at 1250 West Middlefield Road. EPA has named two companies (or their corporate successors) that operated at the site as Potentially Responsible Parties (PRP). Being a PRP means the company could be responsible for some or all of the cleanup. The site also includes the residential and commercial areas north and northwest of these properties impacted by groundwater contamination (see *Figure 1*).

Teledyne and Spectra-Physics operated from the early 1960s. Before then, the properties were used as fruit orchards. Teledyne manufactured semiconductor components, and Spectra-Physics manufactured lasers and laser components.

Both used a variety of chemicals called volatile organic compounds (VOCs), including the chemical trichloroethene (TCE), in their manufacturing processes.

Investigations at the Teledyne and Spectra-Physics properties in the early 1980s identified VOCs in soil and groundwater. During this time, the PRPs began cleanup work. Cleanup work included removing contaminated soil, groundwater extraction and treatment, soil vapor extraction, and institutional controls (ICs). ICs are administrative and legal controls on how the site is used that help protect public health and the cleanup remedy.

Past and Present Groundwater Cleanup Activities

Groundwater was extracted and treated on the former Teledyne property and in two areas west and north of the Teledyne property (i.e., Spring Street Area and North Bayshore Area; *Figure 1*). The Spring Street Area Groundwater treatment system ran from 2007 to 2015, and the North Bayshore Area system ran from 1990 to 2017. The system at the Teledyne property ran from 1986 to 2005, and was turned off to do a groundwater cleanup pilot study, followed by a complete full-site cleanup study. These studies showed bioremediation (a technology that treats chemicals with microorganisms) was effective at decreasing pollutants in groundwater (see *Figure 2*). This bioremediation technology is known as enhanced reductive dechlorination (ERD).

Vapor Intrusion Investigations

There is some potential for VOCs in soil and groundwater beneath the site to move, as vapors, through soil under a building and enter the indoor air. This process is known as vapor intrusion (see *Figure 3*). In 2015, where given permission, EPA conducted indoor air testing inside homes and businesses above the area with contaminated groundwater (see *Figure 4*). A small number of homes and some businesses required more testing or work to address the potential risk of vapor intrusion. This work was performed at no cost to owners or tenants.

Cleanup of Contaminated Soils

The PRPs cleaned up soil contaminated with VOCs by pumping air from between particles of contaminated soil and filtering it. This was first done on the Spectra-Physics property from 1987 to 1999. By 1999, concentrations of VOCs in soil were low enough that the system was shut

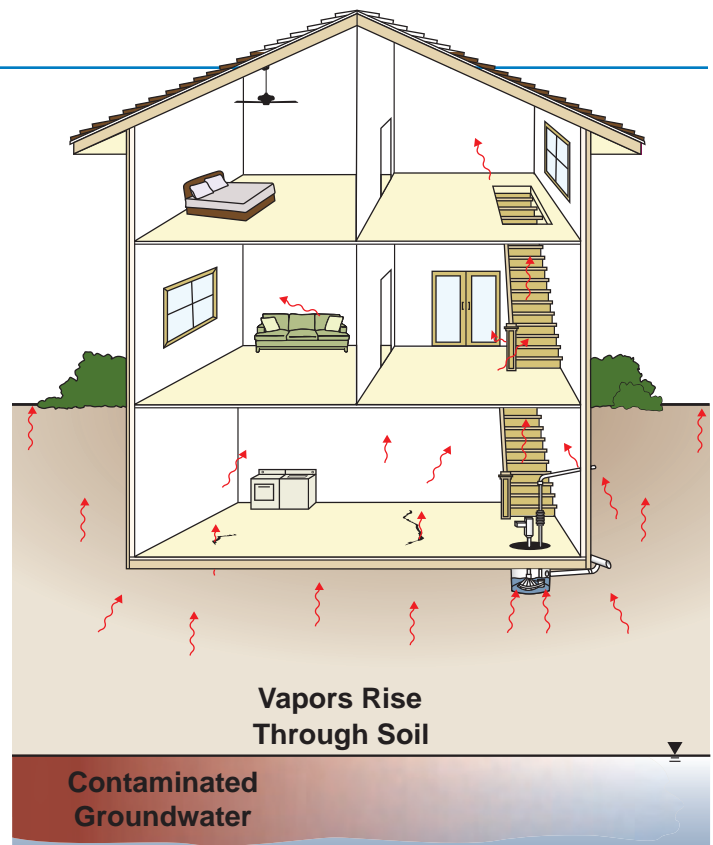


Figure 3: Vapor Intrusion into a Building



Figure 4: Indoor Air Sampling Study Area

down. However, TCE was, again, identified in soil on the Spectra-Physics property in 2013. Shortly thereafter, a new soil vapor treatment system was installed to remove additional TCE and to reduce the risk of vapor intrusion.

Site Risks

EPA defines risk as the chance of a hazardous chemical, when released to the environment, will cause an illness to humans or wildlife. An evaluation was performed to find out whether there are risks to people who live or work near the site.

Breathing VOCs inside buildings, through vapor intrusion, was found to be the only way for residents and commercial workers' health to be at risk. Vapor intrusion poses potential long and short-term health risks to those in buildings over the groundwater plume. All properties EPA has accessed have been sampled.

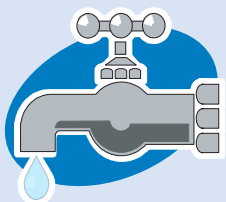
If you live in the Indoor Air Sampling Study Area, shown in Figure 4, and would like to participate, contact the EPA project manager, Angela Sandoval at (415) 972-3831 or sandoval.angela@epa.gov.

TCE in soil was found not to be a risk to human health because the site is fully developed, limiting potential contact with contaminated soil. However, property maintenance or redevelopment may result in the need for construction at the site. To protect construction workers, a soil management plan was developed to protect workers if they were doing below surface construction activities.

Cleaning up VOC contamination at the site is needed because the levels of VOCs in groundwater are above federal drinking water standards, and because potential risks to human health will occur if steps are not taken to address vapor intrusion.

The site and nearby area is considered an area where wildlife presence and habitat is expected to be low. Wildlife is expected to primarily include bird species typically found in an urban environment. Contamination from the site does not pose a risk to wildlife or other ecological receptors.

EPA's preferred cleanup plan for the site, called a "Preferred Alternative," is necessary to protect public health. The Preferred Alternative will clean up contaminated groundwater and continue to protect public health from vapor intrusion.



Drinking Water is Regularly Tested to Make Sure it Meets EPA and State Drinking Water Standards

Your drinking water is not affected by contamination associated with the site. Drinking water is supplied by the Santa Clara Valley Water District and comes from sources such as the Hetch Hetchy Reservoir in the Sierra Nevada Mountains. This public water supply is regularly tested to make sure that it meets all state and federal drinking water standards.

Regulatory Agencies

The State of California, represented by the Regional Water Quality Control Board, is the lead agency for developing and implementing the cleanup plan for the site; EPA provides final regulatory agreement.



Cleanup Objectives

The following groundwater and indoor air cleanup goals, also known as Remedial Action Objectives, will replace previous objectives (soil objectives will not be changed):

Groundwater:

- Remove VOCs from soil and soil vapor in the original source areas to reduce or eliminate continued releases to groundwater.
- Demonstrate that VOCs in groundwater are being sufficiently reduced and meet federal drinking water standards in a reasonable time frame.
- Reduce VOCs concentrations in shallow groundwater to minimize the potential for vapor intrusion.

Indoor Air:

- Prevent vapor intrusion by cleaning up VOCs from shallow groundwater and soil vapor.
- Use new groundwater treatment technologies and vapor intrusion prevention tools.



EPA/State website links and contact information

EPA Contacts

The EPA contact is: **Angela Sandoval**
P.E., Project Manager
(415) 972-3831
sandoval.angela@epa.gov



The EPA website link for the site are: www.epa.gov/superfund/teledyne
www.epa.gov/superfund/spectra-physics

CalEPA Regional Water Board

The State's website link for this site is: <https://geotracker.waterboards.ca.gov/>



Please click on 'Tools', select 'Advanced Search' from the drop-down menu, input file numbers 43S0128 and 43S0120 into the 'Case ID / Global ID - Info' — field, click 'Reports' on the left hand side, then click on 'Site Maps / Documents' tab. If you have questions, please contact **Roger Papler**, Engineering Geologist at (510) 622-2435 or by email roger.papler@waterboards.ca.gov.

Summary of Cleanup Alternatives

EPA developed three cleanup alternatives to clean up groundwater and vapor intrusion. In addition to these alternatives, soil vapor extraction – a technology used currently – will remain from the current remedy to address soil contamination at the site. EPA evaluated how well each of the three cleanup alternatives meet the Remedial Action Objectives and other requirements. The three alternatives are:

- **Alternative 1** - No Action
- **Alternative 2** - Existing Remedy: Groundwater Extraction and Treatment (with no vapor intrusion remedy included)
- **Alternative 3** - Source Area Enhanced Reductive Dechlorination (ERD): Monitoring and Natural Attenuation and Vapor Intrusion Mitigation, Additional Institutional Controls

Alternative 1 - No Action

Under this alternative, the site would be left as is, and any currently operating systems would be shut down. Also, all institutional controls would be removed.

Alternative 2 - Existing Remedy: Groundwater Extraction and Treatment

Groundwater extraction and treatment systems, already built at the site, would start up again as described in the original remedy. This alternative would include turning the pump and treat system (which was previously shutdown) back on, to remove groundwater VOCs above federal standards, and prevent movement of VOC-contaminated groundwater. Groundwater from existing wells would be extracted and treated on-site. The water would be released to the storm sewer once clean. Or alternatively, it may be possible to discharge into the sanitary sewer system, where extracted water would be sent directly to the public sewage plant for treatment under a Discharge Permit from the City of Mountain View.

Vapor intrusion work would end and existing cleanup equipment would be removed. The existing institutional controls, such as restrictions preventing the groundwater from being used as a source of drinking water, would remain in place.

EPA's Preferred Alternative

Alternative 3 - Source Area Enhanced Reductive Dechlorination (ERD): Monitoring and Natural Attenuation (MNA) and Vapor Intrusion Mitigation, Additional Institutional Controls



Bioremediation using ERD would be implemented in the remaining on-property source areas to meet the objective of decreasing VOCs to below federal maximum contaminant levels (MCLs) concentrations in the groundwater within a reasonable timeframe. Microorganisms to promote break down of VOCs (a process called bioremediation) would be injected into the groundwater in limited areas to achieve the cleanup goals. Injection(s) would be followed by groundwater monitoring to demonstrate that contaminants are naturally breaking down (this process is referred to as Monitoring and Natural Attenuation (MNA)) and that the contamination plume is decreasing.

Indoor air testing would continue in the indoor air sampling area (see *Figure 4*), and mitigation actions would be taken, if needed, to control vapor intrusion.

Existing ICs would remain in place. A set of additional institutional controls related to groundwater, soil, and vapor intrusion would be used as appropriate. New institutional controls may include:

- A building permit review process to prevent proposed changes to the building that may affect the remedy's effectiveness.
- Evaluation of new building permits for vapor intrusion potential.

Evaluation of Alternatives

To determine which cleanup alternative was best, EPA evaluated and compared the alternatives using nine evaluation criteria. The nine criteria are used at every Superfund site and are summarized in Figure 5. EPA categorizes the nine criteria into three groups: **threshold criteria**, **balancing criteria**, and **modifying criteria**.

Any alternative must meet the threshold criteria to be chosen as the preferred alternative. The five balancing criteria are used to help select between alternatives and the two modifying criteria may shift the way the cleanup remedy is implemented (see *Figure 5*).

The alternatives are evaluated below in relation to the threshold criteria and the balancing criteria. In addition, EPA will consider community and state acceptance as a modifying criteria after the review of public comments on this plan.

Threshold Criteria

- **Overall Protection of Human Health and the Environment:** Only Alternative 3 (Source Area ERD, MNA and Vapor Intrusion Mitigation) would protect human health. This alternative includes vapor intrusion reduction tools and comprehensive institutional controls to eliminate the community's exposure to the contamination. Alternative 2 (Existing Remedy) would remove contaminated groundwater containing VOCs, but would not address the risk from vapor intrusion until groundwater concentrations have declined. Alternative 1 is not protective of human health or the environment.
- **Compliance with applicable or relevant and appropriate requirements (ARARs)/to be considered (TBCs):** Only Alternative 3 complies with all identified ARARs and TBCs. Alternative 1 would not meet groundwater or vapor intrusion related ARARs/TBCs. Alternative 2 complies with the groundwater ARARs, but does not comply with the vapor intrusion ARARs/TBCs.

Balancing Criteria

- **Long-term effectiveness and permanence:** Alternatives 2 and 3 demonstrate long-term effectiveness and permanence. However, the technologies in Alternative 3 provides better long-term effectiveness and permanence. Bioremediation will convert the VOCs into less toxic chemicals, and the vapor intrusion mitigation and comprehensive institutional controls prevent long-term exposure to VOCs. Alternative 1 would not be effective in the long term.
- **Reduction of toxicity, mobility or volume through treatment:** Alternative 3 would best reduce the toxicity, movement and volume of VOCs in groundwater. Additionally, it would reduce the movement of VOCs in air.

Criteria for Evaluating Remedial Alternatives and How the Alternatives Meet the Criteria

THRESHOLD	1 Overall Protection of Human Health and the Environment This evaluation criterion assesses whether each alternative adequately protects human health and the environment from unacceptable risks posed by contaminants at a site. It draws on the assessments conducted as part of other evaluation criteria.
	2 Compliance with ARARs This evaluation criterion is used to determine if each alternative would comply with federal and state ARARs, or whether invoking waivers to specific ARARs is justified.
BALANCING	3 Long-Term Effectiveness and Permanence This evaluation criterion examines the risk remaining at a site after a remedial alternative has been implemented and the remedial action objectives have been met. In the evaluation completed to support this plan, the primary focus is the adequacy and reliability of the remedial alternatives and the controls that may be required to manage the risk posed by treatment residuals and untreated wastes.
	4 Reduction of Toxicity, Mobility or Volume through Treatment This evaluation criterion addresses the extent to which an alternative employs treatment technologies that permanently and significantly reduce the toxicity, mobility, and volume of hazardous materials at the Site.
	5 Short-Term Effectiveness This evaluation criterion considers the effects of each alternative on workers, the community, and the environment during the construction and implementation process.
	6 Implementability This evaluation criterion is used to evaluate the technical feasibility and administrative feasibility (that is, the ease or difficulty) of implementing each alternative and the availability of required services and materials during implementation.
	7 Cost This evaluation criterion estimates the cost of implementing each alternative, including engineering, construction, and operation and maintenance costs incurred over the life of the project.
MODIFYING	8 State Acceptance This criterion considers whether the State agrees with the EPA's preferred alternative and supporting analyses.
	9 Community Acceptance This criterion considers whether the community agrees with the EPA's preferred alternative and supporting analyses. EPA gives significant weight to comments submitted on its Proposed Plan in evaluating community acceptance.

Figure 5: EPA Evaluation Criteria

Alternative 2 would remove VOC-affected groundwater, reducing the mobility and volume of chemicals within groundwater, but does not reduce those in the indoor air.

Alternative 1 does not meet this criterion since it does not include any treatment.

- **Short-term effectiveness:** Alternative 3 has proven more effective for cleaning up groundwater, compared to Alternative 2 and will help reduce contamination sooner. Alternative 3 also includes vapor intrusion mitigation that is effective in the short term for minimizing exposure due to vapor intrusion but Alternatives 1 and 2 are not effective in reaching cleanup goals in the short term.

- **Implementability:** All three remedies are readily implementable.
- **Cost:** The estimated cost of Alternative 1 is approximately \$1 million to remove existing equipment.

Assuming the existing groundwater pump-and-treat system operates for an additional 30 years, the cost of Alternative 2 is estimated to be approximately \$14.2 million.

Alternative 3 would cost \$10.2 million, over an estimated 30 years, including 15 years of monitoring and natural attenuation, and 30 years of operation and maintenance of vapor intrusion systems.

EPA's Preferred Alternative

The Preferred Alternative to address groundwater and vapor intrusion at the site is Alternative 3. Selecting Alternative 3 would require changing the current remedy.

	Current Remedy	Proposed Remedy
Groundwater	Extraction and treatment	Bioremediation (ERD) and MNA
Soil	Soil vapor extraction	Soil vapor extraction
Institutional Controls	Minimal controls	Additional controls added to current remedy
Vapor Intrusion	Not included in current ROD	Vapor intrusion mitigation tools

Since the current remedy was selected, there have been significant advances in groundwater cleanup technologies and EPA has gained a better understanding of vapor intrusion. Advancements in using bioremediation for VOC cleanups in groundwater, and in measuring and cleaning up indoor air, will allow for cleanup of the site to be faster and more protective. Alternative 3 makes use of this new understanding and technology advancements.

During the treatability study, Alternative 3 showed better treatment performance and implementability with less negative impacts than other alternatives. Conditions favorable to MNA are also present of the site, and have shown to be, at least as effective as the current cleanup plan.

Vapor intrusion mitigation measures and institutional controls, already tested at the site, have been shown to be highly effective in reducing indoor air concentrations. In summary, Alternative 3 provides the best protection to vapor intrusion and uses the latest groundwater cleanup method.

Alternative 3 meets eight of the nine evaluation criteria and provides the most efficient remedial approach for the site. The State of California Regional Water Quality Control Board supports EPA's Preferred Alternative. The ninth evaluation criteria (community acceptance) will be evaluated after comments are received.

In summary, EPA believes the Preferred Alternative provides the best balance of features among the other alternatives. EPA expects the Preferred Alternative to satisfy the following Superfund (CERCLA) statutory requirements: 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and, 5) satisfy the preference for treatment as a principal element.



Former Teledyne Semiconductor Sites & Former Spectra-Physics Lasers Inc.

Mountain View, Santa Clara County, CA

REMEDY COMPARISON

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Existing Remedy	EPA's Preferred Alternative
			Alternative 3 Source Area Bioremediation, Monitored Natural Attenuation, Vapor Intrusion Mitigation Tools and Additional Institutional Controls
Overall Protectiveness	Not Protective	May Not be Protective	Protective
Compliance with ARARs	No	No	Yes
Long-Term Effectiveness	Low	Moderate-High	High
Implementability	High	High	High
Short-Term Effectiveness	Low	Low	High
Reduction of Toxicity, Mobility, or Volume by Treatment	No	Low	High
Estimated Total Cost	\$1 M	\$14.2 M	\$10.2 M
State Agency Acceptance	No	Yes, Previously Accepted	Yes
Community Acceptance	To be Evaluated after Comment Period	To be Evaluated after Comment Period	To be Evaluated after Comment Period

How Can I Comment on the Proposed Plan

EPA encourages the public to review and comment on this plan. The public comment period is from

May 2nd through June 1st, 2018

You are invited to attend a public meeting on **May 24th, 2018** at 6:00 p.m. at:

Senior Center
266 Escuela Avenue
Mountain View, CA 94040

Where EPA will present the plan, answer questions, and record verbal comments. All written comments should be submitted (postmarked) no later than **June 1st, 2018**. Please send comments to Angela Sandoval, as noted on page 1. After the public comment period ends, EPA will review all comments received before making a final decision on the revised remedy to be implemented at the site.

Site Repositories

The Administrative Record File, which includes the Focused Feasibility Study, is available at:

San Francisco Bay Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

EPA Superfund Records Center
75 Hawthorne Street, 4th floor
San Francisco, CA 94105
(415) 536 – 2000

Hours

Mondays through Friday | 8:00 a.m. – 5:00 p.m.

An index of documents in the Administrative Record, selected Site documents, and additional information on the Site are also available at EPA's Spectra-Physics/Teledyne Sites web page at:

<https://www.epa.gov/superfund/teledyne> or
<https://www.epa.gov/superfund/spectra-physics>



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EPA Seeks Public Comment on Proposed Changes to Site Cleanup Plan

Contact Information

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